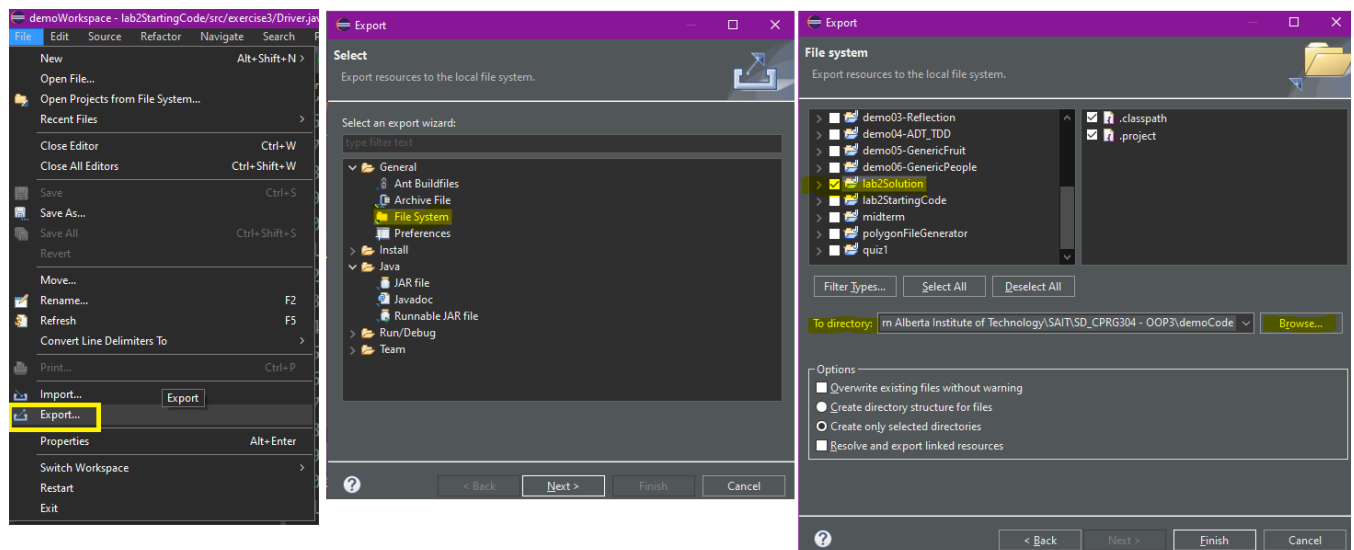# Lab 0: Introduction to Java Programming in Eclipse

Background

In this assignment, you'll dive into the world of the Java programming language using the Eclipse IDE.

- Most programming languages are very similar, especially in OOP.
- Everything you know from Python, C# and any other languages apply to Java, the main difference is syntax.

Instructions

1. This lab can be completed individually or in a group (there is no size limit for the group), complete the exercise below which is an assignment you have done in OOP2 using C#.

   - If working in a group, only one submission is required – **all group members' names must be included in the comments of the submission.**

     o All group members will receive the same grade.

     o It is your responsibility to manage the communication, cooperation and contribution of all group members.

2. See the *Marking Criteria* section below for details on how you will be assessed.

   - If there are more than one submission, both individually or across all group members, only the latest submission before the deadline will be accepted.

3. Submit your completed **zipped** exported Eclipse project to Brightspace by the posted due date.

Exercise

A local company, Modern Appliances, has hired you to implement a system to manage their appliance data more efficiently. They want a system that allows both employees and customers to find, list and purchase appliances.

They company has provided you with a data file containing a sample list of appliances. The data file contains four types of appliances: refrigerators, vacuums, microwaves and dishwashers. Each appliance is uniquely identified using an item number, and information about each type of appliance is described in the formatting section.

Appliance Details

Data Formatting

- Each of the following appliance types is represented differently in the supplied **appliances.txt** file.
- Each line in the file represents a different appliance and each piece of information for an appliance is separated by a semi-colon.
- The first digit of the Item Number indicates the type of the appliance. Each item number is 9 digits long.

Refrigerators

- The first digit of the Item Number for refrigerators is 1.
- Refrigerators have an Item Number, Brand, Quantity, Wattage, Color, Price, Number of Doors, Height and Width (in inches).
- The number of doors value can be either **2** (double doors), **3** (three doors) or **4** (four doors).
- Each refrigerator is represented in the appliances.txt file file as follows:
  ItemNumber;Brand;Quantity;Wattage;Color;Price;NumberOfDoors;Height;Width
  Example:
  089360200;Bosch;176;60;black;2000;2;62;29;

Vacuums

- The first digit of the Item Number for vacuums is 2.
- Vacuums have an Item Number, Brand, Quantity, Wattage, Color, Price, Grade and Battery Voltage.
- The Battery voltage value can be either **18 V** (Low) or **24 V** (High).
- Each vacuum is represented in the appliances.txt file as follows:
  ItemNumber;Brand;Quantity;Wattage;Color;Price;Grade;BatteryVoltage
  Example:

263788832;Hoover;59;600;black;750;Residential;18;

Microwaves

- The first digit of the Item Number for microwaves is 3.
- Microwaves have an Item Number, Brand, Quantity, Wattage, Color, Price, Capacity and Room Type.
- The room type is where the microwave will be installed, and is either **K** (kitchen) or **W** (work site)
- Each microwave is represented in the appliances.txt file as follows:
  ItemNumber;Brand;Quantity;Wattage;Color;Price;Capacity;RoomType
  Example:
  383477937;Miele;201;2350;white;179.9;1.8;Kitchen;

Dishwashers

- The first digit of the Item Number for dishwashers is 4 or 5.
- Dishwashers have an Item Number, Brand, Quantity, Wattage, Color, Price, Sound Rating, and Feature.
- The Sound Rating of the dishwasher can be Qt (Quietest), Qr (Quieter), Qu (Quiet) or M (Moderate).
- Each dishwasher is represented in the appliances.txt file as follows:
  ItemNumber;Brand;Quantity;Wattage;Color;Price;Feature;SoundRating
  Example:
  587065284;Kenwood;74;1010;silver;390;Clean with Steam;Qu;

Program Guidelines

The fact that the data formatting is different for each type of appliance adds a level of complexity to program development. Creating a class hierarchy is required:

- Determine the attributes that are shared between the appliance types and create an **Appliance** class containing them.
  Note: The **Appliance** class cannot be instantiated and must be a super-class.
- Create the following classes such that each one inherits the **Appliance** class and is packaged with their base/super class:
  - Refrigerator
  - Vacuum
  - Microwave
  - Dishwasher

- Ensure that each of these classes has a user-defined constructor that assigns the appropriate attributes.
- The Appliance class should have an implementation of toString() for its attributes
  - Override the *toString()* method in each subclass, so that the relevant attribute can be concatenated to the superclass implementation.

Along with the functionality mentioned above, include the following methods in your program:

- A method that parses the **appliances.txt** file into a single list.
  - The list must be able to contain all appliance types (refrigerator, vacuum, microwave, and dishwasher).
- A method that allows a customer to purchase an appliance.
  - The customer is prompted to enter the item number of an appliance. If the entered item number does not match, the program will inform the customer with an error message. If the item number matches, the program checks the appliance's availability. If there is an appliance available, the available count will be decremented and the appliance information will be displayed. Otherwise, the customer will be informed the appliance is not available.
- A method that prompts the customer to enter a brand. The program performs a case-insensitive search of appliances that have the same brand, and displays them.
- A method that prompts a user to enter a number, and the program then displays that number of random appliances. The appliances can be of any type.
- When the program exits, implement and call a method that takes the appliances stored in the list and persists them back to the **appliances.txt** file in the proper format.

Expected Output

Note: User inputs samples are **bold and underlined**.

```
Welcome to Modern Appliances!

How may we assist you?

1 – Check out appliance

2 – Find appliances by brand

3 – Display appliances by type

4 – Produce random appliance list

5 – Save & exit

Enter option:

    1

Enter the item number of an appliance:

    255131796

Appliance "255131796" has been checked out.

Welcome to Modern Appliances!
```

```
How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

    1

Enter item number of an Appliance:

    143826003

The appliance is not available to be checked out.


Welcome to Modern Appliances!

How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

    1

Enter item number of an Appliance:

    1234567895

No appliances found with that item number.
```

Welcome to Modern Appliances!

How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

2

Enter brand to search for:

Tefal

Matching Appliances:

ItemNumber: 535981394

Brand: Tefal

Quantity: 90

Wattage: 700

Color: bronze

Price: 320

Feature: Third Rack

SoundRating: Quietest

ItemNumber: 243074424

Brand: Tefal

Quantity: 61

Wattage: 4000

Color: black

Price: 760

Grade: Residential

BatteryVoltage: Low

Welcome to Modern Appliances!

How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

   3

Appliance Types

1 - Refrigerators

2 - Vacuums

3 - Microwaves

4 - Dishwashers

Enter type of appliance:

   1

Enter number of doors: 2 (double door), 3 (three doors) or 4 (four doors):

   3

Matching refrigerators:

Item Number: 146947171

Brand: Black & Decker

Quantity: 112

Wattage: 1800

Color: grey

Price: 1800

Number of Doors: Three Doors

Height: 70

Width: 31

Item Number: 172911121

Brand: Philips

Quantity: 144

Wattage: 700

Color: black

Price: 3100

Number of Doors: Three Doors

Height: 71

Width: 30

Welcome to Modern Appliances!

How May We Assist You?

1 – Check out appliance

2 – Find appliances by brand

3 – Display appliances by type

4 – Produce random appliance list

5 – Save & exit

Enter option:

   3

Appliance Types

1 – Refrigerators

2 – Vacuums

3 – Microwaves

4 – Dishwashers

Enter type of appliance:

   2

Enter battery voltage value. 18 V (low) or 24 V (high)

   18

Matching vacuums:

Item Number: 255131796

Brand: Black & Decker

Quantity: 54

Wattage: 1500

Color: white

Price: 500

Grade: Residential

Battery voltage: Low

Item Number: 263788832

Brand: Hoover

Quantity: 59

Wattage: 600

Color: black

Price: 750

Grade: Residential

Battery voltage: Low

Item Number: 231784690

Brand: Russell Hobbs

Quantity: 155

Wattage: 175

Color: grey

Price: 380

Grade: Residential

Battery voltage: Low

ItemNumber: 243074424

Brand: Tefal

Quantity: 61

Wattage: 4000

Color: black

Price: 760

Grade: Residential

Battery voltage: Low

Item Number: 240201796

Brand: Dyson

Quantity: 81

Wattage: 1050

Color: white

Price: 290

Grade: Residential

Battery voltage: Low

Welcome to Modern Appliances!

How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

    3

Appliance Types

1 - Refrigerators

2 - Vacuums

3 - Microwaves

4 - Dishwashers

Enter type of appliance:

    3

Room where the microwave will be installed: K (kitchen) or W (work site):

    W

Matching microwaves:

Item Number: 328237584

Brand: Miele

Quantity: 90

Wattage: 1200

Color: bronze

Price: 250.23

Capacity: 2.1

Room Type: Work Site

Item Number: 333607621

Brand: Vax

Quantity: 113

Wattage: 440

Color: silver

Price: 123.99

Capacity: 1.6

Room Type: Work Site

Welcome to Modern Appliances!

How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

    <u>3</u>

Appliance Types

1 - Refrigerators

2 - Vacuums

3 - Microwaves

4 – Dishwashers

Enter type of appliance:

4

Enter the sound rating of the dishwasher: Qt (Quietest), Qr (Quieter), Qu(Quiet) or M (Moderate):

M

Matching dishwashers:

Item Number: 571522655

Brand: Philips

Quantity: 228

Wattage: 440

Color: grey

Price: 390

Feature: Finger Print Resistant

SoundRating: Moderate

ItemNumber: 493374445

Brand: Philips

Quantity: 125

Wattage: 1650

Color: silver

Price: 510

Feature: Clean with Steam

SoundRating: Moderate

Welcome to Modern Appliances!

How May We Assist You?

1 - Check out appliance

2 - Find appliances by brand

3 - Display appliances by type

4 - Produce random appliance list

5 - Save & exit

Enter option:

    4

Enter number of appliances:

    2

Random appliances:

Item Number: 254565387

Brand: Miele

Quantity: 86

Wattage: 1000

Color: grey

Price: 800

Grade: Commercial

Battery Voltage: High

Item Number: 143826003

Brand: Kenwood

Quantity: 0

Wattage: 4700

Color: silver

Price: 1500

Number of Doors: Double Door

Height: 62

Width: 32

Marking Criteria

	Needs Improvement (0–50%)	Good (51–100%)	Marks
Working Code	• Incorrect Java version used • Syntax errors • Runtime errors	• Correct Java version used • No errors	**/2**
Menu Options	• User cannot choose options from menu or does not function correctly.	• User can choose any options from menu and all functions correctly.	**/2**
Save File	• Persist changes to data file doesn't work correctly	• Persist changes to data file works correctly	**/2**
OOP Modelling	• Inappropriate abstraction • Not using the toString method correctly	• Appropriate abstraction • Overriding the toString method in each inherited class correctly	**/2**
Naming And Style	• Does not follow standard Java naming conventions • Indentations are not consistent	• Follows all standard Java naming conventions • Indentations are consistent	**/2**
Packaging	• Classes are not separated into appropriate packages • Resource files are not in the correct folder	• Classes are separated into appropriate packages • Resource files are in the correct folder	**/2**
Access Control	• Access modifiers are not specified correctly	• Access modifiers are specified correctly	**/2**
Best Practices	• Loops are not controlled correctly • Exceptions are not handled correctly	• Loops are controlled correctly • Exceptions are handled correctly	**/2**
Use (and trust) the IDE!	• Eclipse warnings has not been resolved	• Eclipse warnings have all been resolved	**/2**
Documentation	• No comments are included at the top • No comments indicating major code sections or what they do	• Header comments are included at the top • Inline comments indicating major code sections or what they do	**/2**
			/20